Approved by the U.S. Geological Survey for publication in Proceedings of the 1999 Water Resources Conference, American Water Works Association

MTBE in Ground Water of the United States – Occurrence, Potential Sources, and Long-Range Transport

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Abstract

Under mandates of the Clean Air Act Amendments of 1990, oxygenates must be added to gasoline in some areas of the United States (U.S.) to reduce ozone formation and carbon monoxide emissions. Today, methyl *tert*-butyl ether (MTBE) is the most commonly used oxygenate and in some areas MTBE is also used as an octane enhancer. The large-scale use of MTBE, combined with its high solubility, low soil adsorption, and low biodegradability, has resulted in its detection in many ground-water systems. Low concentrations (#20 Fg/L) of MTBE have been detected frequently in ambient ground water in areas of the U.S. where substantial (>5% by volume in gasoline) amounts of MTBE are used. Some of this ground water is used for domestic and public water supplies. The detection frequencies of MTBE in ambient ground water are about 21% in areas that use substantial (#5% by volume in gasoline) amounts of MTBE. On the basis of limited monitoring data, public water supplies have been affected by low concentrations of MTBE with a frequency of detection of about 7%.

MTBE in ground water can come from a variety of point and nonpoint sources. Low concentrations (#20 Fg/L) may have originated at either point or nonpoint sources but high concentrations (>20 Fg/L) are generally associated with large releases from point sources such as

gasoline stations or pipelines. However, high concentrations can also result from small point source releases or certain nonpoint sources such as areas where concentrations of MTBE in air are high. High concentrations of MTBE have been reported in ground water used for some domestic and public water supplies. In some cases, treatment of the water has been necessary for removal of MTBE or the wells had to be removed from service. At some sites, MTBE has migrated much farther than other common gasoline components and those long travel distances increase the probability that MTBE will be detected in a drinking-water well and that treatment may be required.